solution may vary within substantial ranges "as between .25% to 10% by weight of the sugar to the water"; the preferred range is from .25% to 3%. (Pat. Col. 3, lines 61-64). The immersion time may also vary from ¼ to 5 minutes, but an immersion time of 1 to [illegible] minutes is preferred. (Pat. Col. 3, lines 71-74). While the temperature of the solution may range from just above its freezing point to its boiling point, the preferred range is between 60° F. and its boiling point. (Pat. Col. 3, line 74-Col. 4, line 3). The specifications state that the higher temperatures are not necessary except where a leaching action is required. (Pat. Col. 4, lines 6-8). The patentee recommends a frying time of 4½ minutes and a frying temperature of 360° F., although stating that satisfactory results are obtainable within the range of 300° to 425° F. (Pat. Col. 3, lines 8-15). Finally, the specifications recite that in practice the patentee uses a 1% dextrose solution at its boiling point and varies the dipping time in relation to the natural sugar content of the potato particles, utilizing a 1 minute dip where the natural sugar content of the particles is uniformly low; increasing the immersion time to 3 minutes if their natural sugar content is low to medium; and using a 2 minute dip if the raw potatoes are of mixed low and high natural sugar content. (Pat. Col. 4, lines 22-37).

The foregoing description of the patented invention is copied *verbatim* from the opinion of the District Court (App. B 25-27). In petitioners' opinion it is a complete, accurate, and concise summary of the patent specification. As the sole ruling by the Court of Appeals was to affirm only that part of the decision made by the District Court which concerned the alleged failure of the patent specification to comply with the provisions of 35 U.S.C. § 112 (App. A 18), we will not quote further from the trial court's opinion. However, in petitioners' opinion, the summary by the District Court (App. B 28-33) of the facts established by the evidence is a complete and accurate statement of all

the facts necessary to a judgment on the issues of validity and infringement of the claims in suit and, in petitioners' opinion, the error in that court's ruling that the specification of the patent in suit does not comply with 35 U.S.C. § 112 lies wholly in its application of the law to the stated facts. More particularly, it is plain from the trial court's summary of the proven facts that there was no experimentation in the *practice* of the patented process, but only in the selection of the potatoes to be processed. It was the potato buyer and not the potato cook who did the experimenting.

REASONS FOR GRANTING THE WRIT

The Case and the Questions

Petitioners have stated two questions presented. Both are presented by *the case,* though erroneous decision of Question 2 by both courts below prevented either from reaching Question 1. This petition seeks to have this Court exercise its certiorari jurisdiction to reach and decide, or bring about the decision of *both* questions.

It is *the case,* and the questions it presents, not the *opinion* below and the errors it presents, which justify the exercise of that jurisdiction.

Question 1—not decided below—is of great interest to industry generally, and particularly to those engaged in research. It is inextricably mixed with Question 2. That is to say, in this case the "discovery" sought to be patented involves the processing of an agricultural product—the potato—and a potato has all of the variations of complex living organisms making its processing to a marked degree a matter of art and of experience, and not of mathematics or of theory. If the answer to Question 1 is, "Yes," and if the discovery sought to be patented involves the processing of a living organism, the thrust of the decisions below, if their confusion between the requirements of 35 U.S.C.

§ 112 (App. A 17) as to "description" on the one hand and "claim" on the other permits any thrust fairly to be discerned, is that § 112 imposes such requirements of unattainable specificity as to make the patentability affirmed by that affirmative answer to Question 1 impossible to realize in practice.

Question 1

When the patent statutes were revised in 1952, the following sentence at the end of new 35 U.S.C. § 103 (App. A 16-17) appeared in them for the first time: "Patentability shall not be negatived by the manner in which the invention was made." Prior to 1952 there was much confusion in the decisions of the courts with respect to the patentability of "discoveries" as distinguished from "inventions." Many held that only the final accomplishment of a sought-for creation was entitled to patent protection.

Almost as soon as the 1952 Patent Act went into effect, the question of whether § 103 of it changed or ratified the prior case law because the burning question of the patent law. Judge Picard in the Eastern District of Michigan was one of the first to rule on the matter and he found the provision about obviousness to be merely a statement of the already established case law, *Gagnier Fibre Products Co.* v. *Fourslides, Inc.*, 112 F. Supp. 926 (E.D. Mich. 1953), but he went on to observe:

> "Attention is also directed to this clause in Section 103:
>
> 'Patentability shall not be negatived by the manner in which the invention was made.'
>
> This, we must admit is new, because in a Senate report that clause is clarified and it does change some phases of case law. As stated in the report this particular wording was used to provide the Patent Examiners and the Courts with a yardstick that in considering the patent-

ability of any article from January 1, 1953 on, it would be immaterial whether the invention

> 'resulted from long toil and experimentation or from a flash of genius.'

This wording officially not only rejects the 'flash of genius' test of Cuno Engineering Corp. v. Automatic Devices Corp., 314 U.S. 84, which this court necessarily followed in Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp., 340 U.S. 147, but it goes farther. Today one may have a patent if he just 'stumbled' upon his invention or it might even have been the result of an accident. But the 'flash of genius' is not claimed in this case."

Although Judge Picard and most courts wrestling with 35 U.S.C. § 103 since, *e.g.* the Court of Appeals for the Third Circuit sitting *en banc* in *R. M. Palmer Co.* v. *Luden's, Inc.*, 236 F. 2d 496 (3 Cir. 1956), have related the Congressional intent to the overruling of the unfortunately worded "flash of genius" dictum in the *Cuno** case, it also clearly and squarely overrules the attempt of one-time Judge Thurman Arnold to introduce subjective, as opposed to objective, tests of patentability, *Potts* v. *Coe*, 140 F. 2d 470 (D.C. Cir. 1944), on motion to vacate, 145 F. 2d 27 (D.C. Cir. 1944).

This Court should now add its authoritative voice to that of Congress, laying the ghost of subjective tests of patentability which Judge Arnold attempted to insert into the patent law from criteria he evolved from the perfervid record of T.N.E.C. as effectively as it laid another patent law spectre from the same Chas. Addams source in *Special Equipment Co.* v. *Coe.*, 324 U.S. 370 (1945). Discoveries made by accident or diligent trial and error are as patentable as those made by inspiration or intelligence and this Court should say so.

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* *Cuno Corp.* v. *Automatic Devices Corp.*, 314 U.S. 84, 91 (1941).

In the present case, the inventor builded better than he knew at first and solved a problem by a process he evolved before he knew the problem existed, for he thought he had invented how to add fry color to potatoes that would not color enough by using a dilute sugar solution bath. His present co-plaintiff General Foods established that that mere "add-color" aspect of his process had been publicly used some years before his invention. Patentee did not learn of this prior art until years after the patent had issued. But his early work with his process in its initial add-color aspect led to the discovery—or realization—by him that in certain circumstances the process would produce a new and surprising result—namely, that a dilute sugar solution bath may provide a simultaneous treatment applicable to potato pieces of varying sugar content and hence of varying fry color so that upon simultaneous frying all the pieces will have substantially the same color. As the resume of the patent specification already set forth clearly shows, he clearly described in the patent itself both the sought-for "add-color" invention he thought he had made and the serendipitous uniformity producing process he actually also discovered. Thus, a discovery sought to be patented, and the one now asserted to have been validly so patented, was made by accident and as an unforeseen and unpredictable, though inherent, consequence of the application of the dilute sugar solution bath under proper conditions.

Whether such a discovery so made is patentable, if new, is essentially Question 1.

No case in which "the manner in which the invention was made" has been an issue has heretofore reached this Court. It would be a great help to the Patent Bar and to manufacturers in all fields for this Court to express its opinion on this important question. It is not a question involved directly in, or to be decided indirectly by, decision of any of the four cases involving another aspect of 35

U.S.C. § 103 which are now awaiting decision by this Court.*

This Court should grant this petition, reverse the erroneous decision below of Question 2, and thus permit this important Question 1 to be reached and decided. The billion pound yearly production of the product involved is earnest enough of the importance of the question. As President Johnson recently proclaimed:

> "The United States patent system plays a major role in an intellectual achievement of our era that is without parallel. Never before has man unlocked so many secrets of nature and applied the acquired knowledge with such beneficial effects to mankind. The Nation's gratitude is owed to the creative and ingenious work of the inventor and to others involved in the patent process—the attorney, the agent, the patent examiner.* * *" "Patents: Spur to American Progress," U.S. Dept. of Commerce, 1965, page 2.

Question 2

The importance of Question 2 is made clear by the confusion and misunderstanding of the statute made evident by the opinions below.

The District Court, *inter alia,* wrote (App. B 43):

> ". . . neither the patent specifications nor the claims disclose any such limitation; as a result, a person attempting to use the process could only ascertain the limitation by experimentation."

But the "limitation" referred to is *not* as a matter of law or logic, necessary, or said to be necessary, to be observed in the practice of the process as described in the patent or as practiced by the defendant.

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* *Graham* v. *John Deere Co.*, No. 11 (Oct. 1965 Term); *Calmar, Inc.* v. *Cook Chemical Co.*, No. 37 (Oct. 1965 Term); *Colgate-Palmolive Co.* v. *Cook Chemical Co.*, No 43 (Oct. 1965 Term); *United States* v. *Adams*, No. 55 (Oct. 1965 Term).

The Court of Appeals said it was affirming this ruling of the trial court when it wrote that the claims were invalid "because of the extent of experimentation required by one skilled in the art in order to ascertain their 'teaching'." (App. B 21).

Both courts below had evidently confused the descriptive part of the specification, which "discloses" or "teaches," with the claims, which "limit" or define the monopoly; 35 U.S.C. § 112 does not permit such confusion and the following analysis of the errors made below will, petitioners urge, confirm the importance to the patent law of this Court's intervention to bring the lower courts back to the plan and policy and purpose of the statute.

The purpose of patent claims is not to "teach." The claims in the *application,* as filed, should state "what the applicant regards as his invention." This is required by the *second* paragraph of 35 U.S.C. § 112. The claims in the *patent* as granted, however, recite, as a result of the examining procedure, the features of the particular process, for example, which the Patent Office regards as patentable. The recited features may be—and usually are—but a small part of the entire process described in the specification. It is horn-book law that the claims are always to be read in the light of the full description required by the *first* paragraph of 35 U.S.C. § 112. In fact, the third paragraph of the section provides that the steps in a claimed process may be identified *solely* by reference to the descriptive part of the specification.

It is clear from the evidence and the opinion of the District Court that no experimentation whatsoever was required or practiced in producing the several billion pounds of frozen French fried potatoes that have been produced by the patented process since the complaint in the first suit against General Foods was filed in 1961.

The error of law below no doubt arose as follows:

Not all potatoes may be simultaneously processed in a single batch and produce frozen French fried potatoes of the desired uniform color. In selecting the potatoes to be purchased and processed, a "fry test," fully described in the patent in suit and in the District Court's opinion (App. B 30) is used. Only those lots of potatoes are purchased in which the highest sugar content of any tested potatoes is not excessive and the difference between the highest and lowest sugar content is not over four of the seven classifications, *viz,* "very low, low, medium low, medium, medium high, high, and very high," in which the test fried potatoes are classified. For example, a load containing potatoes of medium high, high, and very high would not be purchased for immediate processing, while potatoes of low, medium low, medium and medium high sugar content could be immediately processed in a single batch and produce frozen French fried potatoes of the same desired uniform color.

In its opinion, the District Court quotes with apparent approval, petitioners' statement with respect to the nature and scope of the patentee's invention:

> "Plaintiffs appear to be in agreement with defendant that Baxter's claimed invention resided in his alleged discovery that equalization of the sugar content of the surface layers of raw potato particles of unequal natural sugar content, and hence uniform color of the fried particles, could be attained by a single sugar dip under the conditions set forth in his patent. Baxter's alleged contribution to the art of processing French fried potatoes is set forth on page 12 of Plaintiffs' Main Brief. There plaintiffs state, 'The essential novel feature of the process is the simultaneous treatment of potato pieces of varying sugar content in such manner that upon simultaneous frying all the pieces will have substantially the same color.' Indeed, plaintiffs concede that the patent itself permits no other conclusion." (App. B 34)

This is a correct statement of petitioners' position and, until Dr. Smith's testimony in this case, it was apparently the belief of all parties to the litigation, including the General Foods personnel, that when a batch of potatoes of mixed high and low sugar content (Pat. Col. 4, lines 35-36) was dipped in a hot sugar solution of medium concentration, the resulting color of the dipped potato was, on frying, the color that the potatoes of medium sugar content would have had, if fried without dipping. Apparently, the patentee and his attorney did not know—or did not have in mind at the time the application was prepared—that starch gelatinizes at 140°F. and believed that on dipping the potatoes in the sugar solution the solution *replaced* some of the potato juice with a resulting reduction of the sugar content of the juice of the potatoes of high sugar content and an increase of the sugar content of the low sugar potatoes, all as stated in the patent. Dr. Smith, however, testified that this is not so. Dr. Smith said that the sugar solution taken up by the treated potatoes is not substituted for a like quantity of potato juice, but is *added to* the potato juice so that on frying the resulting uniform color of all of the treated potatoes would be the same as the color of potatoes of high sugar content and not potatoes of medium sugar content.

The reason given by Dr. Smith for this conclusion is stated in the District Court's opinion (App. B 37-38) namely that at temperatures above 140°F. starch gelatinizes and absorbs the sugar solution from the bath which is not therefore substituted for a like quantity of potato juice. But whether the patent correctly or incorrectly states a theory of what causes the treated potatoes of *different* original sugar content to have the *same* color on frying after being subjected to the *same* treatment is entirely immaterial. The color of French fried potatoes depends not only on the sugar content of the potato juice but also on the time and temperature of cooking and the parties to this suit have in

their commercial operations selected the potatoes varying over a range suitable to be processed by using a "fry test" as described in the patent in suit, have dipped the slices to be fried cut from *all* selected potatoes in the same sugar solutions at a selected concentration for the same time, and have thereby produced French fried potatoes of uniform color of the particular shade desired for the particular customer by varying the cooking time. Perhaps the treated potatoes required a slightly shorter cooking time to have the same color as untreated potatoes of the highest natural sugar content used would have had, but no one knew it, except Dr. Smith, and but for this law suit the French fried potato industry would have continued, happy in its ignorance.

The patent statutes nowhere require any statement of a theory to explain the *why* of a new process; they require a clear prescription of the *how*. That *how* is clearly stated in the patent in suit, but the courts below found the patent invalid because the *why* seemed to have been stated incorrectly. The claims define what the monopoly is quite clearly; they do not tell how to apply the process to any particular batch of potatoes. The patent statutes leave that "teaching" or "disclosing" role to the descriptive part of the specification, but the courts below found the patent invalid because the claims covered in their monopoly all the ranges that would work with any conceivable batch of potatoes. To require more would make agricultural product processes unclaimable. It is important that this Court correct this error of the courts below, else Question 1, though requiring a "Yes" answer, will not be reached through perpetuation of the error below in the answer to Question 2.

Summary

We believe it will be obvious to this Court on reading the patent and the District Court's summary of the evidence (App. B 25-33) that any foreman in a food processing

establishment or any professional cook would be fully informed by the patent specification as to just what to do and how to do it in order to produce French fried potatoes of the desired uniform color from potatoes of different sugar content. We believe it will be obvious to this Court that the District Court erroneously believed that the sufficiency of the descriptive specification required by 35 U.S.C. § 112 was in some way related to the scope of the claims as ultimately allowed in the granted patent. We believe that the importance of the questions presented by this *case* is clear and their timely decision worthy of attention by this Court.

We further believe that the astounding extent of the allegedly infringing use of the patented process in these last years of the patent term also justifies this Court in granting this petition, reversing the Court of Appeals, and remanding the case to the District Court for its judgment on the specific fact aspects of the other issues of validity and infringement of the patent in suit.

CONCLUSION

For the foregoing reasons, this Petition for Writ of Certiorari should be granted.

Respectfully submitted,

W. Brown Morton
W. Brown Morton, Jr.,
425 Thirteenth Street, N.W.
Washington, D. C. 20004
Counsel for Petitioner.

January 27, 1966

APPENDIX A

Title 35, United States Code, Sections 100, 101, 103, and 112:

§ 100. Definitions

When used in this title unless the context otherwise indicates—

(a) The term "invention" means invention or discovery.

(b) The term "process" means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material.

(c) The terms "United States" and "this country" mean the United States of America, its territories and possessions.

(d) The word "patentee" includes not only the patentee to whom the patent was issued but also the successors in title to the patentee. July 19, 1952, c. 950, § 1, 66 Stat. 797.

§ 101. Inventions patentable

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title. July 19, 1952, c. 950, § 1, 66 Stat. 797.

§ 103. Conditions for patentability; non-obvious subject matter

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary

skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made. July 19, 1952, c. 950, § 1, 66 Stat. 798.

§ 112. Specification

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof. July 19, 1952, c. 950, § 1, 66 Stat. 798.

APPENDIX B

1. Text of Judgment sought to be reviewed:

UNITED STATES COURT OF APPEALS

FOR THE FIRST CIRCUIT

No. 6516

H. C. BAXTER & BRO., ET AL.,
Plaintiffs, Appellants,

v.

THE GREAT ATLANTIC & PACIFIC TEA COMPANY, INC.,
Defendant, Appellee.

JUDGMENT

October 29, 1965.

This cause came on to be heard on appeal from the United States District Court for the District of Maine, and was argued by counsel.

Upon consideration whereof, It is now here ordered, adjudged and decreed as follows: The judgment of the District Court is affirmed.

By the Court:

/s/ ROGER A. STINCHFIELD,
Clerk.

2. Opinion of Court of Appeals in support of judgment sought to be reviewed:

UNITED STATES COURT OF APPEALS

FOR THE FIRST CIRCUIT

No. 6516

H. C. BAXTER & BRO., ET AL.,
Plaintiffs, Appellants,

v.

THE GREAT ATLANTIC & PACIFIC TEA COMPANY, INC.,
Defendant, Appellee.

APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MAINE

[236 F.Supp. 601]

Before ALDRICH, *Chief Judge,* HAMLIN,
*Senior Circuit Judge,** and MCENTEE, *Circuit Judge.*

W. Brown Morton, Jr., with whom *W. Brown Morton, Paul A. Wescott, McLean, Morton and Boustead, Pennie, Edmonds, Morton, Taylor and Adams* and *Drummond & Wescott* were on brief, for appellants.

Nicholas John Stathis, with whom *William B. Mahoney, John T. Kelton, Elmer R. Helferich and Watson, Leavenworth, Kelton & Taggart* were on brief, for appellee.

OPINION OF THE COURT

October 29, 1965.

PER CURIAM. This is an appeal from a finding of invalidity of a process patent for pretreating French fried

*Sitting by designation.

potatoes so they will fry to a substantially even color. The facts and an extensive discussion are found in the opinion of the district court, 236 F.Supp. 601. Without deciding whether the evidence justified a conclusion that the patent claims in suit are invalid because wholly inoperative, we think the evidence supports the court's holding that they are invalid under 35 U.S.C. § 112 because of the extent of experimentation required of one skilled in the art in order to ascertain their "teaching."

Affirmed.

3. Text of Judgment of District Court:

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF MAINE
SOUTHERN DIVISION

H. C. BAXTER & BRO., A PARTNERSHIP,
and
GENERAL FOODS CORPORATION, A CORPORATION OF DELAWARE, *Plaintiffs*,

v.

THE GREAT ATLANTIC & PACIFIC TEA COMPANY, INC., A CORPORATION OF MARYLAND, *Defendant*.

Civil Action No. 7-136

FINAL JUDGMENT

This civil action having been commenced on December 26, 1962 by H. C. Baxter & Bro., the then owner of United States Letters Patent No. 2,498,024 charging defendant with infringement of the said patent, and subsequently, by an instrument dated January 7, 1963, an undivided 13% interest in the said patent having been asigned by H. C. Baxter & Bro. to General Foods Corporation, and General Foods Corporation having been joined as a party plaintiff on February 14, 1964, and plaintiffs having relied only upon claims 1, 6 and 7, of the said patent, and this civil action having come on to be heard by the Court sitting without a jury upon all of the pleadings of the parties and upon the pre-trial order entered herein on March 10, 1964, and trial having been had and testimony and proofs on behalf of the parties having been taken, and briefs having been submitted and arguments having been presented by the parties, and due deliberation having been had thereon, and the

Court having rendered a written opinion on December 10, 1964, directing, among other things, that judgment be entered dismissing the complaint;

NOW, THEREFORE, on motion of William B. Mahoney, Esq., attorney for defendant, IT IS HEREBY ORDERED, ADJUDGED AND DECREED:

1. That this Court has jurisdiction of the parties and of the subject matter of this cause.

2. That claims 1, 6 and 7, of United States Letters Patent No. 2,498,024 are invalid.

3. That the complaint herein be, and the same hereby is, dismissed with prejudice.

4. That defendant's counterclaim herein, insofar as it seeks a declaratory judgment that claims 1, 6 and 7, of United States Letters Patent No. 2,498,024 are invalid, be, and the same hereby is, sustained.

5. That plaintiffs shall recover no profits or damages or any other monetary payment from defendant.

6. That defendant have and recover of plaintiffs, jointly and severally, full costs and disbursements to be taxed by the Clerk of this Court, and that defendant have execution therefor against plaintiffs, jointly and severally.

7. That defendant's prayer that it be awarded a reasonable attorneys' fee be, and the same hereby is, denied.

Dated: Portland, Maine

December 18, 1964

/s/ EDWARD T. GIGNOUX
Edward T. Gignoux
United States District Judge

Judgment entered this 18th day of December, 1964.

/s/ MORRIS COX
Clerk

4. Opinion of District Court:

UNITED STATES DISTRICT COURT

DISTRICT OF MAINE
SOUTHERN DIVISION

H. C. BAXTER & BRO., A PARTNERSHIP,

and

GENERAL FOODS CORPORATION, A CORPORATION OF DELAWARE, *Plaintiffs*,

v.

THE GREAT ATLANTIC & PACIFIC TEA COMPANY, INC., A CORPORATION OF MARYLAND, *Defendant*.

Civil Action No. 7-136

OPINION AND ORDER OF THE COURT

GIGNOUX, Judge.

This is an action for infringement of United States Letters Patent No. 2,498,024, entitled "Prefrying Treatment of Potatoes," issued on February 21, 1950, to John L. Baxter of Brunswick, Maine, upon application Serial No. 689,205 filed on August 8, 1946. The action was instituted on December 26, 1962, by the then owner of the patent, H. C. Baxter & Bro. Subsequently, on January 7, 1963, H. C. Baxter & Bro. assigned to General Foods Corporation an undivided 13% interest in the patent, and on February 14, 1964, General Foods was joined as a party plaintiff. Plaintiffs rely only upon claims 1, 6 and 7 of the patent. In its answer, defendant asserts the customary defenses of invalidity and non-infringement. Defendant also counterclaims for a declaratory judgment that the patent is invalid and not infringed by it, and for a reasonable attorneys'

fee and its costs. Plaintiffs seek an accounting, and both parties request appropriate injunctive relief.

As described in the patent specifications, the claimed invention "relates to the treatment of raw or cooked potato particles and particularly to such particles in the form of strips for French frying, in order to secure a desired and substantially uniform change in their color when they have been suitably cooked by frying." (Pat. Col. 1, lines 1-6). The specifications recite that in the frying of potatoes on a commercial basis, it is important that they be suitably browned when fried; and whether suitable browning can be attained depends on their sugar content. (Pat. Col. 1, lines 7-11). Where the sugar content of the potatoes is low, as is the case when the potatoes are freshly dug, the potato particles do not change color sufficiently when cooked by frying. On the other hand, if the sugar content of the potatoes is high, the particles when suitably fried are too dark because of the caramelization of the sugar.[1] (Pat. Col. 1, lines 12-26). While the sugar content of potatoes may be governed to some extent through a control of storage temperatures,[2] the expense of controlling storage conditions is substantial. (Pat. Col. 1, lines 29-37). The alleged invention purports to minimize the problem "by treating raw or cooked potato particles to establish, at least in the surface layer of the particles, a sugar content such that when the particles are suitably cooked by frying, the desired color change will result with substantial uniformity." (Pat. Col 1, lines 40-46). This result is stated to be accomplished by immersing the particles in a solution of a

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[1] As the record shows, caramelization is the degradation or breakdown of the sugar molecules by heat—what a layman would describe as burning.

[2] Under normal storage conditions potatoes will acquire a relatively high sugar content. If the storage temperatures are relatively high, however, the content of the potatoes will be low. Generally, the lower the storage temperature, the higher the sugar content; the higher the storage temperature, the lower the sugar content. (Pat. Col. 3, lines 28-35).

sugar that may be absorbed by the particles and then cooking them by frying in a suitable medium, the characteristics of the solution, the time of immersion, and the frying time and temperature being so related to each other and to the natural sugar content of the particles that the desired color change is attained upon frying. (Pat. Col. 1, line 46-Col. 2, line 6). In the patentee's own words,

> Where the natural sugar content is low, the treatment adds sugar to supplement any natural sugar that may be present in the particles. Where the natural sugar content is high but capable of being corrected by leaching, I dip the particles in a hot sugar solution so that at the completion of the leaching step a final sugar content is established that ensures that the desired color is secured when the particles are fried. Where the natural sugar content of some of the potatoes is high and too low in others, the hot sugar solution has a combination effect establishing and maintaining substantial uniformity of sugar content by a limited leaching action on the particles having excessive natural sugar and supplementing any natural sugar in particles having a sugar deficiency. (Pat. Col. 2, lines 7-23).

The patent specifications recite that while the sugar content of the potato particles may be determined by any suitable means, this may be done with sufficient accuracy for the purposes of the invention by frying samples under the conditions to be used in frying the particular batch of potatoes and comparing the color of the thus fried samples with a color chart showing the sugar content by color preestablished by frying various samples under uniform conditions of time and temperature. (Pat. Col. 2, lines 24-41).

The specifications further state that the primary requirement of the sugar is that it be readily absorbed by the potato particles. (Pat. Col. 3, lines 51-52). Suitable sugars are specified to be, in the class of monosaccharides, dextrose,

fructose and galactose; in the class of disaccharides, sucrose, lactose and maltose; and raffinose, a trisaccharide. (Pat. Col. 3, lines 53-56). The patent states that while any of these sugars may be used, dextrose "is perhaps best suited for the practice of . . . [the] invention under commercial conditions." (Pat. Col. 3, lines 57-60). The sugar solution may vary within substantial ranges "as between .25% to 10% by weight of the sugar to the water"; the preferred range is from .25% to 3%. (Pat. Col. 3, lines 61-64). The immersion time may also vary from ¼ to 5 minutes, but an immersion time of 1 to 3 minutes is preferred. (Pat. Col. 3, lines 71-74). While the temperature of the solution may range from just above its freezing point to its boiling point, the preferred range is between 60° F. and its boiling point. (Pat. Col. 3, line 74-Col. 4, line 3). The specifications state that the higher temperatures are not necessary except where a leaching action is required. (Pat. Col. 4, lines 6-8). The patentee recommends a frying time of 4½ minutes and a frying temperature of 360°F., although stating that satisfactory results are obtainable within the range of 300° to 425°F. (Pat. Col. 3, lines 8-15). Finally, the specifications recite that in practice the patentee uses a 1% dextrose solution at its boiling point and varies the dipping time in relation to the natural sugar content of the potato particles, utilizing a 1 minute dip where the natural sugar content of the particles is uniformly low; increasing the immersion time to 3 minutes if their natural sugar content is low to medium; and using a 2 minute dip if the raw potatoes are of mixed low and high natural sugar content. (Pat. Col. 4, lines 22-37).

The patent claims in suit read:

> 1. The method of treating potato particles, the natural sugar content of which is such that the desired color change cannot be attained when the particles are cooked by frying, which method comprises preparing

a solution of a sugar that may be absorbed by the particles and in which the percentage by weight of the sugar to the liquid is within the range of .25% to 3%, immersing the particles in the solution for a period of from 1 to 3 minutes to affect the sugar content in at least the surface layers of the particles, and frying the thus treated particles in a frying medium at a temperature within the range of 300° to 425° F.

6. The method of treating potato particles, the natural sugar content of which is too low to enable the desired color change to be attained when the particles are cooked by frying, which method comprises preparing a solution of a sugar that may be absorbed by the particles and in which the percentage by weight of the sugar to the liquid is from .25% to 3%, and immersing the particles in that solution for a time inverse to its concentration and within the range of from 1 to 3 minutes, thereby to secure a desired substantially uniform color change when the particles are cooked by frying.

7. The method of claim 6 in which the sugar is a monosaccharide such as dextrose, fructose, and galactose.

A brief statement of the development and commercial history of the Baxter process will be helpful to an understanding of the patent questions which are presented in this litigation. The evidence discloses that H. C. Baxter & Bro. is a business partnership, which, with its predecessor partnership, has been engaged in producing and marketing food products for many years. Baxter's original products were canned vegetables, but during World War II one of its major products was dehydrated potatoes for the United States Army. In 1944, with the end of World War II approaching, the partnership established a products development committee to find other products which might utilize its potato handling facilities. After limited experimenta-

tion with canned French fried potatoes, the Baxter management decided to develop a process for the commercial production of frozen French fried potatoes; and by the fall of 1945 the firm was devoting most of its research to this endeavor. Baxter's quality control manager, Francis R. Saunders, was in charge of the project under Mr. Baxter's general supervision.

One of the first problems encountered by the partnership in developing a process for the commercial production of frozen French fried potatoes was that of obtaining a satisfactory brown color in the finished product. Saunders found that the freshly dug potatoes he was using in his experiments turned out almost white in color when fried. Mr. Baxter recalled that during the early 1930's the partnership had attempted to reduce the cost of producing its canned cream-styled corn by substituting dextrose for sucrose as a sweetening agent, but that it had been forced to abandon the practice because the dextrose had had the undesired effect of darkening the color of the creamed corn. At a staff meeting in November 1945 he suggested that a satisfactory color for the frozen French fried potatoes might be achieved by treating the raw potato strips with a dextrose solution. Subsequently, during the fall and winter of 1945-46 Saunders conducted a series of experiments with the use of various sugar dips to obtain a satisfactory brown color after frying. He found that a sucrose dip did not produce the desired result, but that a dextrose dip did. In December 1945 Mr. Baxter first determined to apply for a patent upon the process thus developed, and in February 1946 he requested his patent counsel to prepare a patent application.

Baxter's first commercial production of frozen French fried potatoes was a sales test run for General Foods in March 1946. At that time Baxter was selling its entire production of frozen fresh vegetables to what is now the Birds

Eye Division of General Foods. Following the success of the test run, in the spring of 1946 Baxter commenced construction of a plant at Corinna, Maine, and in January 1947 it began full-scale production of frozen French fried potatoes for distribution by General Foods as a part of its Birds Eye line.[3] At about this time Baxter and General Foods entered into a written contract by which Baxter agreed to produce frozen French fried potatoes exclusively for General Foods for a period of five years. It was also orally agreed that General Foods might have free use of the Baxter patent during the term of the contract, and that the parties would collaborate in further development of the Baxter process.

The initial Baxter process for the production of frozen French fried potatoes may be briefly described as follows. Representative samples of incoming lots of raw potatoes, whether from the field or from storage, were graded as to sugar content by a "fry test." For the purposes of the "fry test," French fry strips were cut from 20 potatoes selected at random from each lot, and these were fried for 4½ minutes at a temperature of 350°F. The fried strips were then classified as to color in seven groups, namely, "very low," "low," "medium low," "medium," "medium high," "high," and "very high." If a given lot met acceptable standards,[4] the raw potatoes were successively washed, steam-peeled, inspected and trimmed for defects, mechanically sliced and cut into strips, again washed, and then blanched from 1 to 3 minutes in a hot water blancher containing a .75% dextrose solution at a temperature of

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[3] Since January 1947 Baxter has produced its frozen French fried potatoes through Snowflake Canning Company, a corporation which is wholly owned by the partnership and the individual partners.

[4] Saunders testified that the original Baxter process permitted use of potatoes in the "low," "medium low," "medium" and "medium high" groups, provided there was no more than a three-group spread in any one lot.

185°F.[5] After emerging from the blancher, the potato strips were conveyed on a wire mesh drainage belt to two stage fryers. In the first fryer they were fried for 2 minutes and 55 seconds at 340°F. In the second fryer they were fried for 1 minute and 10 seconds at 370°F.[6] After leaving the fryers, the potato strips were drained of surplus fat, air cooled, packaged, labelled and frozen.

General Foods in 1949, prior to the expiration of its 5-year contract with Baxter, commenced construction of an extension to its existing frozen foods processing plant at Caribou, Maine. Shortly thereafter it began to use the Baxter process to produce frozen French fried potatoes for its own account. As General Foods expanded its production at Caribou, it became apparent that it would no longer require Baxter's full production; and the parties mutually agreed to terminate Baxter's exclusive obligation under the 5-year contract. As a result, in 1951 Baxter began selling frozen French fried potatoes to other customers.

In 1952 both Baxter and General Foods modified the original Baxter manufacturing process by the addition of a hot water blanching step in advance of the hot dextrose dip, the purpose being to permit the processing of potatoes having a wider variation of sugar content. By the modified process the raw potatoes were still graded as to sugar content in seven groups by the "fry test"; but by the addition of the hot water blanch before the hot dextrose dip, the parties found that four of the seven groups could be used, instead of three, and the desired color of the final product

[5] Mr. Baxter described the blancher as "a long cylindrical machine; galvanized iron covers over it, and steam pipes going into it and a screw arrangement going through the bottom of it to carry the product through the water, the hot water, which, [sic] in this case the hot dextrose which is contained within the blancher."

[6] Subsequently, Baxter converted to a single fryer in which the potato strips were fried for 1½ minutes at 370-375° F.

still could be achieved.[7] Baxter and General Foods have used the modified process, essentially without change, continuously since 1952.

Following expiration of the Baxter-General Foods 5-year contract, General Foods' purchases of frozen French fried potatoes from Baxter gradually diminished and ceased altogether about 1960. In 1961 Baxter instituted in this Court an action against General Foods for infringement of its patent. This action was settled in January 1963, shortly after Baxter had commenced the present action against defendant, by the assignment to General Foods of a 13% interest in the patent.[8]

Baxter began selling frozen French fried potatoes to defendant about 1952. In 1961 defendant started construction of its own plant for the production of frozen French fried potatoes at Fort Fairfield, Maine, and its purchases from Baxter stopped when the Fort Fairfield plant began commercial production in October 1962. The process initially installed and presently used by defendant at its Fort Fairfield plant includes two plain hot water blanches prior to the dextrose dip.[9] The blanched potato strips then pass through an S-shaped flume containing a 2% dextrose solu-

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[7] It is not clear from the record whether Baxter or General Foods originated this idea. In any event, personnel from the two plants were working closely together during this period on improvements upon the original Baxter process; and as Mr. Baxter testified, "Perhaps it occurred to them first or perhaps to us, or perhaps it was a mutually conceived idea."

[8] Under the terms of the settlement General Foods agreed to pay Baxter $20,000, of which $10,000 was to be paid on the date of the settlement and $10,000 was to be paid upon termination of the present action. General Foods also agreed to pay Baxter any royalties which might accrue to General Foods by reason of its interest in the patent up to the amount of $200,000. Plaintiffs' witnesses deny that the institution of the present action was a condition of this settlement.

[9] In the first hot water blancher the raw potato strips are subjected to water at 160° F. to 170° F. for 2½ to 3 minutes; in the second hot water blancher, they are subjected to water at 170° F. to 190° F. for a further 2½ to 3 minutes.

tion at 160°F., in which they remain from 5 to 7 seconds. The evidence further discloses that defendant controls the sugar content of the raw potatoes by rigorously regulated storage under controlled temperatures, both in outside warehouses and in bin boxes in the plant, in order to level out their sugar content before they are processed.[10]

The two basic issues in this action are whether claims 1, 6 and 7 of the patent in suit are valid and whether they are infringed by defendant's process. Because, in the view of the Court, the evidence compels the conclusion that the claims in suit are invalid, the Court feels it appropriate to dispose of the case on the issue of validity, and finds it unnecessary to reach the questions raised as to infringement. Cf. *Grant Paper Box Co.* v. *Russell Box Co.*, 151 F. 2d 886, 890 (1st Cir. 1945), *on rehearing judgment vacated on other grounds*, 154 F. 2d 729 (1st Cir.), *cert. denied*, 329 U.S. 741 (1946).

Defendant's main contention, which is dispositive of this action, is that the Baxter patent is invalid on the grounds of inoperativeness and indefiniteness.[11] According to defendant, the major premise of the patent "is that immersing the potatoes in a sugar solution has an automatic combination effect of reducing the natural sugar content where it is high by leaching out sugar and supplementing the natural sugar content where it is low by adding sugar." (Post-Trial Memorandum of Defendant, p. 3.) Defendant's position is that the process described in the Baxter patent is ineffective to accomplish this asserted result because it does

[10] In May 1964, in anticipation of the trial of the present action, defendant successfully operated its Fort Fairfield plant for ten days on a commercial production basis without using dextrose (or any other sugar) in its process.

[11] Defendant also argues that the patent is invalid on various other grounds, including prior knowledge and public use, 35 U.S.C. § 102 (a) and (b), and lack of invention, 35 U.S.C. § 103. Because of the Court's conclusion that the patent is invalid for inoperativeness and indefiniteness, the Court has no occasion to consider these alternative contentions.

not leach out sugar and because some of the specified sugars do not add sugar.

Plaintiffs appear to be in agreement with defendant that Baxter's claimed invention resided in his alleged discovery that equalization of the sugar content of the surface layers of raw potato particles of unequal natural sugar content, and hence uniform color of the fried particles, could be attained by a single sugar dip under the conditions set forth in his patent. Baxter's alleged contribution to the art of processing French fried potatoes is set forth on page 12 of Plaintiffs' Main Brief. There plaintiffs state, "The essential novel feature of the process is the simultaneous treatment of potato pieces of varying sugar content in such manner that upon simultaneous frying all the pieces will have substantially the same color." Indeed, plaintiffs concede that the patent itself permits no other conclusion. Thus, plaintiffs agree that the critical concept of the patent is stated in the following paragraph of the specifications:

> Where at least some of the particles have an excess of natural sugar, but not such an excess that cannot be corrected by leaching, the sugar containing solution is hot. *This has the effect of leaching the excess natural sugar from some particles and supplementing the natural sugar, if any, in other particles to establish a substantially uniform sugar content of the surface layers of the batch.* Where all of the particles are characterized by an excess of natural sugar, the use of my invention is important as, at the end of the leaching operation, the particles have the desired sugar content. (Pat. Col. 4, lines 9 through 21). (Emphasis supplied.)

The file history of plaintiffs' patent reveals that in prosecuting the application in the Patent Office, Baxter admitted that it was known that sugar could be leached from pota-

toes by water blanching,[12] but asserted novelty in adding sugar to achieve color. Documentary and deposition prior art relied upon by defendant, however, eliminates any basis for such a contention. The documentary prior art shows that it was known prior to Baxter that the sugar content, and, more particularly, the reducing sugar content,[13] determined the amount of browning obtained by French frying of potatoes under given conditions of time and temperature. It also reveals an appreciation that the sugar content of potatoes can be controlled by storing them at regulated temperatures. (See Sweetman, Journal of Agricultural Research, Volume 41, pp. 479-489, September 15, 1930; Peacock and Brunstetter, United States Department of Agriculture Circular No. 158, March 1931; Sweetman, American Potato Journal, Volume X, pp. 169-173, September 1933; Wright et al., United States Department of Agriculture Technical Bulletin No. 507, February 1936; Rogers et al., American Potato Journal, Volume XIV, pp. 269-290, September 1937; Thornton, Abstracts of Papers 99th Meeting American Chemical Society, Cincinnati, Ohio, pp. 18-19, April 8-12, 1940; Denny and Thornton, Contributions Boyce Thompson Institute, Volume 11, pp. 291-303, 1940, Volume 12, p. 217-252, 1941, and Volume 12, pp. 405-429, 1942). Depositions in evidence further show that it was common knowledge long prior to 1945, the earliest date claimed by Baxter, among chefs and produce men supplying potatoes for French frying that when the natural sugar content of the potatoes was such that they would not brown sufficiently

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[12] This acquiescence was apparently because of the disclosure of the Brunstetter patent (U.S. No. 2,056,884, issued October 6, 1936) and the Swartz patent (U.S. No. 2,212,461, issued August 20, 1940), both of which were cited by the Patent Office examiner in rejecting Baxter's initial claims.

[13] As defendant's expert, Professor Ora Smith, testified, the sugars present in potatoes are of two types, reducing sugars and non-reducing sugars; the latter are ineffective for the purpose of obtaining the desired browning reaction except that if sufficiently high frying temperatures are employed, some browning may be obtained as the result of caramelization.

on frying, the desired browning could be attained by soaking the potato strips in a solution of sugar or dextrose for a period of several hours or overnight. (See depositions of Longo,[14] Poncelet, Weiss, Lee, Brownhoffer, Jackson, Jones, Ziegler, Micas, Sullivan, Posti, Gabrinetti and Kreis.) In sum, documentary and deposition prior art, none of which was cited to or apparently considered by the Patent Office examiner, discloses that the addition of sugar to potatoes to secure the desired color upon frying was well known long before Baxter.

The evidence thus plainly shows that, as defendant asserts and plaintiffs concede, the sole feature of novelty in Baxter's claimed invention was the use of a single sugar dip to obtain color uniformity in potatoes of varying sugar content. The serious question raised by defendant is whether the process as described by Baxter in his patent is effective to accomplish this result. Upon the record before it, the Court must conclude that it is not, both because the process described in the patent does not effect leaching at all, or at least over substantially the entire range of concentrations and immersion times specified in the claims, and because the patent includes sugars which are inoperative to attain the claimed result under the conditions of use which the claims set forth.

Evidence offered by defendant shows that with a sugar solution no leaching or reduction of sugar content occurs under the conditions described in the patent. Defendant's expert witness, Dr. Ora Smith, Professor of Vegetable

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[14] Longo, a produce man in Providence, Rhode Island, testified that he obtained the idea of dipping raw potato strips in a dextrose solution to attain a satisfactory fry color from baker friends of his, who told him that they used dextrose to attain a brown color in their baked goods. Longo also testified that he dipped the potato strips in the solution for about a minute and at first used five pounds of powdered dextrose to forty gallons of water. Professor Smith calculated that the result was a 1.5% dextrose solution. Longo varied the solution to obtain the desired degree of browning.

Crops and of Food Science and Technology at Cornell University, testified that some leaching might occur in a cool solution of sugar, but at a rate which would be too slow to be of any practical value. In any event, the patent teaches that in order to leach, the solution must be hot (Pat. Col. 4, lines 9-12). Professor Smith testified without equivocation, however, that no leaching or reduction of sugar content takes place in a hot sugar solution, that is, in a solution having a temperature of about 140°F. or higher, within the range of concentrations and durations of immersions specified in the claims. In this regard, the following excerpt from a colloquy between Professor Smith and the Court succinctly summarizes his conclusions:

> The Court: Let me ask the question again with the limitations that I believe you have indicated. Am I correct in my understanding, Professor Smith, that in your opinion immersing untreated high sugar content potatoes in a dextrose solution having a temperature of 140 degrees fahrenheit or higher will not reduce the sugar content of the potatoes?
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> • • • • •
>
> The Witness: No, that will not reduce the sugar content.
>
> The Court: And that will be your opinion if the solution were within the range of one-quarter of one per cent to three per cent by weight of the sugar to the liquid?
>
> The Witness: Yes, sir.
>
> The Court: And this is for the reasons which you stated in the course of your testimony this morning?
>
> The Witness: Yes, sir.
>
> The Court: Thank you very much.

Professor Smith explained that no leaching or reduction of sugar content occurs under these conditions because at temperatures of 140° F. and higher the starch gelatinizes

at the surface of the potato; and as the starch gelatinizes, it absorbs the sugar solution. While a small amount of the natural sugar in the potato may tend to move outward from the center and go into the solution, this amount is small in comparison with the sugar absorbed from the solution by the gelatinized starch. In short, the net effect with a hot sugar solution is that sugar is added to the potato surface and no leaching or reduction of sugar content occurs.

Professor Smith's conclusions are fully supported by experimental work which he conducted in conjunction with Carl O. Davis, a research associate at Cornell University. In these experiments potato strips cut from different varieties of potatoes, which had been stored at different temperatures, were blanched in solutions of dextrose and of the various other sugars specified in the patent. The temperature of the solution in each instance was 210° to 212° F., close to its boiling point. The concentration of the solution was varied over a range from .5% to 3%, and the strips were immersed in the solution for periods ranging from .5 to 4 minutes. The strips were then fried at 360° F. for periods from 3 to 5 minutes. The results of these experiments and color slides showing the fried strips were received in evidence as Defendant's Exhibits 12 (pp. 7-15, 28-34 and 36-38), and 11, 13 and 14. They showed no leaching or reduction of color.

In support of plaintiff's contention that the Baxter process is effective to "level" the varying sugar content of raw potato strips, they point to Mr. Baxter's testimony to the effect that one purpose of the single blancher process "was to reduce and equalize the color of variable-colored —originally colored strips, equalizing and having a uniformity-producing effect," and the testimony of both Baxter and Saunders that the process was "very effective" to accomplish this purpose. However, Baxter's and Saunders' testimony as to their observations in this regard is in sharp

conflict with that of Dr. Kenneth G. Dykstra, research engineer of the Birds Eye Division of General Foods, and George W. Raye, manager of General Foods' Caribou plant. Both testified that the single blancher process did not produce satisfactory results with potatoes which had "either a high or a variable sugar content." Dr. Dykstra further stated that for this reason General Foods could not utilize in the original Baxter process potatoes which had not been conditioned or stored in such a way that they had a low sugar level, and that it was necessary to store the potatoes at a temperature of "70 or something like that, to bring these sugars down to an acceptable level."[15] Raye's testimony was to the same effect.

Other than Plaintiffs' Exhibits 29 and 36, plaintiffs offered no evidence of experimental work to support the teaching of the patent that leaching or reduction of sugar content is obtained when a hot sugar solution is used. With respect to the work done by Saunders in 1945 and 1946 prior to the filing date of the Baxter application, there is no record of any experiments involving the use of a sugar dip to reduce the color of high sugar content potatoes upon frying. In fact, it is evident that the experimentation being conducted by the Baxter group in 1945 and 1946 was directed toward solving the problem of attaining sufficient color from low sugar content potatoes without over-frying.[16]

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[15] Dr. Dykstra also testified that Baxter had found it necessary to condition the raw potatoes by controlled storage in order to bring down their sugar content before they could be processed.

[16] In communicating his invention to his patent attorney, Mr. Baxter said nothing about the removal of sugar by leaching. In fact, his letter of February 28, 1946, requesting his attorney to initiate the patent application contains the following significant statement: "We have found that by dipping the cut raw stock in a 2% dextrose solution long enough for it to become a part of the outside surface of the potato we get, after frying, a beautiful golden brown color from potatoes that would never normally brown up because of low sugar. *We also find that this doesn't have any effect upon potatoes that would be normally brown because of higher sugar content.*" (Emphasis supplied.)

In rebuttal, plaintiffs offered in evidence Plaintiffs' Exhibits 29 and 36. They report the results of experiments conducted by Saunders during the course of the trial for the purpose of establishing that some leaching could be produced using a hot sugar solution within the ranges stated in the patent. Plaintiffs' Exhibit 29, however, concerned an experiment with potato chips which were dipped for 3 minutes in a .25% dextrose solution at 190° F. The results were inconclusive. While some over-all lightening may have been effected, Saunders admitted on cross-examination that uniformity of color was not achieved, for the dextrose-treated chips after frying had substantially the same variation in color as the untreated control chips. Saunders further admitted that the experiment was essentially meaningless because of the greater leaching possibilities of potato chips.

Plaintiffs' Exhibit 36 concerned an experiment involving potato strips which were blanched in a solution having the minimum dextrose (.25%) at the maximum temperature (212° F.) for the maximum time (3 minutes). All conditions were at the extremes of the claim ranges. On cross-examination, Saunders testified that he had not conducted any tests to determine whether a dextrose solution of more than .25% would effect leaching. He further admitted that in his early experimental work he had found that a .5% dextrose solution at the boiling temperature "had practically no effect in reduction of color" of medium potatoes, and that it "would tend to add sugar" to medium low, low and very low potatoes; and that his experimental work at that time "showed that there would not be any lightening effect with a 1% solution at the boiling temperature," even though the patent recommends use of a 1% dextrose solution at its boiling point in practice. (Pat. Col. 4, lines 22-27).

Thus, by plaintiffs' own admissions no leaching is obtained using a dextrose solution at .5% and higher. At best plaintiffs' evidence shows that leaching occurs only with

a .25% dextrose solution at the extreme limits of the patent claims, and even then plaintiffs have adduced no evidence that a solution having the minimum sugar content, under these conditions is effective simultaneously to add sugar to low sugar content potatoes and to produce the equalizing effect which the patent claims.[17]

The core of plaintiffs' position is contained in the statement in the patent specifications, to which reference has been made, that a hot sugar dip "has the effect of leaching the excess natural sugar from some particles supplementing the natural sugar, if any, in other particles to establish a substantially uniform sugar content of the surface layers of the batch." (Pat. Col. 4, lines 12-17). This, plaintiffs assert, is an accurate statement of the observed result of the described hot sugar dip on batches of potato strips "where at least some of the particles have an excess of natural sugar, but not such an excess that cannot be corrected by leaching . . ." (Pat. Col. 4, lines 9-11). This is the so-called "equilibrium" theory advanced by Saunders, which he finally admitted did not prove out in practice.[18] Defendant's evidence, and plaintiffs' own admissions, establish that these statements in the patent in respect of

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[17] Saunders testified that it was "questionable" that a .25% dextrose blanch would be effective to increase the sugar content of medium low potatoes so as to achieve uniformity in a batch of medium low, medium and medium high potatoes.

[18] Saunders' "equilibrium" theory was that when raw potato strips are immersed in a dextrose solution, there is an exchange of fluids and solids between the strips and the solution, so that equilibrium is achieved between the sugar content of the surfaces of the potato strips and the solution. In other words, if the sugar content of the potato strips is greater than that of the solution, sugar is leached from the strips; but if the sugar content of the potato strips is less than that of the solution, sugar is added to the strips. On cross-examination, however, he admitted that while theoretically there should be some leaching and a reduction of color if a potato containing .75% reducing sugar (a medium low potato) were dipped in a .35% dextrose solution, actually "there is some sugar deposited in the surface cells and the color would be increased slightly." It was at this point that he abandoned his "equilibrium" theory with the admission, "I don't believe it does prove out in practice."

leaching sugar from the potato are simply untrue. Thus, the patent teaches the results which are unobtainable.

Under such circumstances, the patent and all of its claims are invalid for inoperativeness. A patent may be granted only on a new and "useful" process, machine, manufacture, or composition of matter. 35 U.S.C. § 101.[19] The term "useful" as used in the patent law means that the invention must attain the result claimed by the inventor in his disclosure; in other words, it must work and accomplish the purposes set forth in the specifications. *O'Reilly* v. *Morse,* 56 U.S. (15 How.) 62, 119 (1853); *Coupe* v. *Royer,* 155 U.S. 565, 572-74, 579 (1895); *H. Brinton Co.* v. *Mishcon,* 93 F. 2d 445, 448 (2d Cir. 1937); *Moffett* v. *Fiske,* 51 F. 2d 868, 871-72 (D.C. Cir. 1931); *Besser* v. *Merrilat Culvert Core Co.,* 243 Fed. 611, 612 (8th Cir. 1917); *Commonwealth Engineering Co.* v. *Ladd,* 199 F. Supp. 51 (D.C.D.C. 1961); *Isenstead* v. *Watson,* 157 F. Supp. 7, 9 (D.C.D.C. 1957). In *O'Reilly* v. *Morse, supra* at 119, the Supreme Court spoke directly to the point in issue:

> Whoever discovers that a certain useful result will be produced, in any art, machine, manufacture, or composition of matter, by the use of certain means, is entitled to a patent for it; provided he specifies the means he uses in a manner so full and exact, that any one skilled in the science to which it appertains, can, by using the means he specifies, without any addition to, or subtraction from them, produce precisely the result he describes. *And if this cannot be done by the means he describes, the patent is void.* (Emphasis supplied.)

Even accepting plaintiffs' evidence that leaching may occur with a .25% dextrose solution at the maximum tem-

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[19] "§ 101. Inventions patentable

Whoever invents or discovers any new and *useful* process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title." (Emphasis supplied.)

perature and time of immersion specified in the patent claims, neither the patent specifications nor the claims disclose any such limitation; as a result, a person attempting to use the process could only ascertain the limitation by experimentation. The law is clear that the necessity for such experimentation invalidates the patent, because of the requirement of 35 U.S.C. § 112 that:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

In *General Electric Co.* v. *Wabash Co.*, 304 U.S. 364, 369 (1938), the Supreme Court stated of this requirement:

> Patents, whether basic or for improvements, must comply accurately and precisely with the statutory requirements as to claims of invention or discovery. The limits of a patent must be known for the protection of the patentee, the encouragement of the inventive genius of others and the assurance that the subject of the patent will be dedicated ultimately to the public. The statute seeks to guard against unreasonable advantages to the patentee and disadvantages to others arising from uncertainty as to their rights. The inventor must 'inform the public during the life of the patent of the limits of the monopoly asserted, so that it may be known which features may be safely used or manufactured without a license and which may not.' (Footnotes omitted.)

The Supreme Court has many times held that the requirement of accurate definition contained in Section 112, and its predecessor, is not met when the patented process can be carried out only after independent experimentation. *Standard Brands* v. *Yeast Corp.*, 308 U.S. 34, 38 (1939);

The Incandescent Lamp Patent, 159 U.S. 465, 474 (1895); *Tyler* v. *Boston*, 74 U.S. (7 Wall.) 327, 330 (1868); *Wood* v. *Underhill*, 46 U.S. (5 How.) 3, 5 (1847). And see *Libbey-Owens-Ford Glass Co.* v. *Celanese Corporation of America*, 135 F. 2d 138, 144-145 (6th Cir. 1943); *Standard Oil Co.* v. *Tide Water Associated Oil Co.*, 154 F. 2d 579, 582-83 (3d Cir. 1946); 2 Walker, Patents § 163, pp. 753-55 (Deller's ed. 1937). Thus, in *Tyler* v. *Boston*, *supra* at 330, the Supreme Court stated:

> Where a patent is claimed for such a discovery, it should state the component part of the new manufacture claimed with clearness and precision, and not leave the person attempting to use the discovery to find it out 'by experiment.'

Likewise, in *Standard Brands* v. *Yeast Corp.*, *supra* at 38, the Supreme Court quoted and agreed with the following conclusion of the court below:

> '. . . But even if the process disclosed by Hayduck be held to constitute invention, the patent is invalid for indefiniteness as was held by the learned District Judge. Both the times and manner in which the concentrated nutrient solution is to be added may be ascertained as we have stated solely by experimentation. The disclosure of the patent is therefore too vague and indefinite to constitute invention.'

And in *Standard Oil Co.* v. *Tide Water Associated Oil Co.*, *supra* at 582-83, the court said:

> The most immediate test of sufficiency of precision in description following from the policy just outlined is that no inventor may compel independent experimentation by others to ascertain the bounds of his claims.

Consequently, even if plaintiffs' evidence is given the maximum credence to which it is entitled, the claims in suit are invalid because the disclosure of the patent is too vague and indefinite to meet the statutory requirement of

precision in describing the alleged invention.

Claims 1 and 6 must also be declared invalid because the patent includes within its disclosure sugars which the evidence shows are inoperative to produce the desired result. Among the sugars specifically mentioned in the specifications as useful are sucrose and raffinose. (Pat. Col. 3, lines 53-56). Professor Smith testified that sucrose and raffinose are inoperative to produce any darkening in the color of potatoes after frying under the conditions specified in the patent. Again, his conclusions are supported by the experimental work conducted by him and Davis. The results as to sucrose are set forth in Defendant's Exhibit 12 (pp. 16-27, 31-34, 36-38). In these experiments potato strips of different varieties which had been stored at different temperatures were blanched in a sucrose solution at 210-212° F., the concentration being varied over a range from .5% to 3% for periods ranging from .5 to 4 minutes. The strips were then fried at 360° F. for periods from 3 to 5 minutes. The color of the fried potato strips was then compared with the color of control potato strips which had been blanched in plain hot water but otherwise similarly treated. Color slides showing the resulting strips were received in evidence (Defendant's Exhibits 11, 13 and 14). The potato strips dipped in sucrose did not acquire in frying any darker color than the control potatoes.[20] Similar tests utilizing a one-minute dip in a 1% raffinose solution at 210-212° F., followed by frying at 360° for 5 minutes, effected no color change as compared to control samples which were blanched in plain hot water under the same conditions (Defendant's Exhibit 12, p. 38).[21]

[20] In a few instances a slightly darker color may have resulted, but Professor Smith explained that in these cases the sugars in high sugar content potatoes had probably caramelized when longer frying times were used.

[21] Professor Smith's tests also show that two other sugars specifically mentioned in the patent, maltose and lactose, and one sugar which is generally included in the patent, melibiose, do not produce browning. (Defendant's Exhibit 12, pp. 35 and 37.)

Professor Smith explained that a sucrose dip may be effective to achieve browning, but only under special conditions which are not disclosed by the patent. Thus, if potato strips are left immersed in a sucrose solution overnight,[22] the invertase in the potato causes at least part of the sucrose to break down by hydrolysis into two monosaccharides, dextrose and fructose, which are reducing sugars and which on frying serve to give the desired browning effect. Very high frying temperatures and long frying times also may cause a breakdown of the sucrose through caramelization to give a brown color. But neither condition is disclosed by the patent. In sum, Professor Smith's testimony, which was fully supported by his experimental work, was that no color change is effected with a sucrose or raffinose solution except under conditions, not taught by the patent, which may give a brown color as the result of hydrolysis or caramelization.[23]

In rebuttal, plaintiffs introduced in evidence the results of an experiment conducted under Saunders' direction during the course of the trial for the purpose of establishing that some browning could be achieved within the ranges of the patent using sucrose and raffinose solutions. This experiment was described in Plaintiffs' Exhibit 33. It involved a series of tests with individual sugars covered by the Baxter patent in an attempt to get browning with each. Both the sucrose and raffinose solutions were at a concentration of 3% and a temperature of 185° F., and a 3-minute immersion time was used. The sucrose-treated potatoes were fried for 2 minutes at 385° F.; the raffinose-treated potatoes were fried for 2½ minutes at 385° F. Saunders admitted that the maximum sugar concentration and the maximum immersion time specified in the patent claims had been employed in an attempt to get browning with

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22 This was the practice followed by some of the chefs, *supra*.

23 Professor Smith's conclusions as to sucrose are also supported by the prior documentary art. (See, e.g., Denny and Thornton, *supra*.)

these sugars because in prior experiments he had been unable to do so at other points within the patent range and he knew that these sugars did not work throughout practically the entire range of the patent. It further developed on cross-examination of Frederick W. Turner, an associate of Saunders, who had conducted the actual manipulations for the experiment, that the control samples had been fried for only 1½ minutes at a temperature of 365° F. Turner could not state, therefore, whether the sugar treatment or the longer frying time and higher frying temperature had caused any darkening of the strips which had been treated with sucrose and raffinose. For this reason the experiment was valueless. Significantly also, plaintiffs failed to exhibit the resulting strips in evidence, although counsel had stated that he intended to do so and that the frozen samples were present in Court. There is nothing in the record to indicate what the color of the samples was, and the record contains only the general statements of Saunders and his associate to the effect that the color was "satisfactory" for commercial sale.[24]

Apart from Plaintiffs' Exhibit 33, plaintiffs offered no experimental evidence to show that sucrose and raffinose were effective in carrying out the patented process. Plaintiffs' witnesses admitted that these sugars do not work throughout practically the entire range of the patent. In the view of the Court the experiment reported in Plaintiffs' Exhibit 33 is wholly insufficient to overcome defendant's comprehensive expert and experimental evidence that sucrose and raffinose are inoperative at any point within the limits stated in the patent claims. Cf. *In re Perrigo*, 18 C.C.P.A. (Patents) 1323, 48 F. 2d 965 (1931).

Claims 1 and 6 in suit envisage the use of "a sugar that may be absorbed by the [potato] particles." Under settled principles, these broadly stated claims must be read in the

[24] In fact, Turner testified that the color of the treated samples, although more uniform, was no darker than that of the untreated control strips.

light of the specification which specifically mentions sucrose and raffinose as useful for the practice of the claimed invention. (Pat. Col. 3, lines 53-56). See *Grover Mfg. Co.* v. *Linde Co.*, 336 U.S. 271, 277 (1949); *General Electric Co.* v. *Wabash Co., supra* at 373; *Holland Furniture Co.* v. *Perkins Glue Co.*, 277 U.S. 245, 255 (1928). But defendant's evidence establishes that sucrose and raffinose are inoperative to produce the desired color change under the conditions specified in the patent. Claims 1 and 6 are therefore fatally defective under the established doctrine that claims to the exclusive use of a class, some of the members of which are inoperative in carrying out the patented process, are too broad and cannot be sustained. *Holland Furniture Co.* v. *Perkins Glue Co., supra* at 256-57; *Corona Co.* v. *Dovan Corp.*, 276 U.S. 358, 385 (1928); *The Incandescent Lamp Patent, supra* at 472-76; *Patrol Valve Co.* v. *Robertshaw-Fulton Controls Co.*, 210 F. 2d 146, 151-52 (6th Cir. 1954); *Libbey-Owens-Ford Glass Co.* v. *Celanese Corporation of America, supra* at 145-46; *American Chemical Paint Co.* v. *Firestone Steel Prod. Co.*, 117 F. 2d 927, 929-30 (6th Cir. 1941); *Matheson* v. *Campbell*, 78 Fed. 910, 915-16, 923 (2d Cir. 1897).[25]

As the Supreme Court stated in *Corona Co.* v. *Dovan Corp., supra* at 385:

> We come then to the question of the validity of Claims 1, 5 and 9 of the patent, which seek to appropriate to the patentee the process of treating rubber by combining with the rubber compound 'a disubstituted guanidine.' Now the class of disubstituted guanidines includes not only D. P. G. but all other derivatives of guanidine in which two of the hydrogen atoms of the guanadine [sic] nucleus have been substituted by other groups . . . . (T)here are between fifty and one

[25] This line of authority shows that this doctrine is but a special application of the requirement of 35 U.S.C. § 112, *supra*, that the patented process must be described so precisely that independent experimentation is unnecessary.

hundred substances which answer this description, of which there is quite a number that are not accelerators at all. Weiss could certainly not claim the entire group of such compounds. He makes no showing that there is any general quality common to disubstituted guanidines which makes them all effective as accelerators. Claims for their exclusive use cannot therefore be sustained. This is shown by the decision of this Court in the *Incandescent Lamp Patent*, 159 U.S. 465, where the Court said, at page 475:

'If, as before observed, there were some general quality, running through the whole fibrous and textile kingdom, which distinguished it from every other, and gave it a peculiar fitness for the particular purpose, the man who discovered such quality might justly be entitled to a patent; but that is not the case here.'

For the reasons which have been stated, the Court holds that claims 1, 6 and 7 of the patent in suit are invalid.

Judgment will be entered dismissing the complaint, and sustaining the counterclaim insofar as it seeks a declaratory judgment that claims 1, 6 and 7 of Baxter Patent No. 2,498,024 are invalid. Since there has been no showing of such unusual circumstances in this case as to make it grossly unjust for defendant to bear the burden of its own counsel fees, defendant's prayer for an attorneys' fee is denied. 35 U.S.C. § 285. *Merrill* v. *Builders Ornamental Iron Co.*, 197 F. 2d 16, 25-26 (10th Cir. 1952); *Wilson* v. *Seng Co.*, 194 F. 2d 399 (7th Cir. 1952); *Park-In-Theatres, Inc.* v. *Perkins*, 190 F. 2d 137 (9th Cir. 1951). Compare *Plymouth Rubber Co.* v. *Minnesota Mining & Mfg. Co.*, 203 F. Supp. 595 (D.C. Mass. 1962), *aff'd and modified as to scope of injunction*, 321 F. 2d 151 (1st Cir. 1963); and *Grant Paper Box Co.* v. *Russell Box Co.*, 106 F. Supp. 616 (D.C. Mass. 1952), *aff'd*, 203 F. 2d 177 (1st Cir.), *cert. denied*, 346 U.S. 821, *rehearing denied*, 346 U.S. 905 (1953). Nor, in the view of the Court, has defendant made out a

case for the issuance of an injunction. *Jaybee Mfg. Corp.* v. *Ajax Hardware Mfg. Corp.*, 287 F. 2d 228 (9th Cir. 1961). Compare *Kessler* v. *Eldred*, 206 U.S. 285 (1907) and *Plymouth Rubber Co.* v. *Minnesota Mining & Mfg. Co.*, *supra*.

Counsel for defendant will submit a proposed form of judgment within ten days.

Dated at Portland, Maine, this 10th day of December, 1964.

/s/ EDWARD T. GIGNOUX
Judge, United States District Court

A true copy
Attest:
Morris Cox, Clerk
By E. Sax
Deputy Clerk